

HISTORICAL NOTICES
ON THE OCCURRENCE OF
INFLAMMATORY AFFECTIONS
OF
THE INTERNAL ORGANS
AFTER
EXTERNAL INJURIES AND SURGICAL OPERATIONS.

BY
WILLIAM THOMSON, M.D.
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS AND SURGEONS.

"Præter locum vulneratum, totum corpus examinandum extus et intus, num non adsit alia causa mortem inferens, quæ dubiam lethali-tatem vulneris faciat."—DE GORTER, *Chirurgia Repurgata*, § 1200.

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HISTORICAL NOTICES, ETC.*

THE attention of the writer was first directed in a particular manner to the occurrence of internal inflammatory affections after local injuries and surgical operations, by some cases of this nature which occurred under the care of MM. Janson and Mortier, at the Hotel-Dieu of Lyons, during his attendance at that hospital in the latter part of 1823. The following notices were prepared in the winter of 1824-25, with a view to being used for a Probationary Essay, or Inaugural Dissertation. Circumstances occurred to interfere with that intention, and they were placed by the writer in the hands of his late friend, Professor Turner, where they remained till the time of his death in 1835. Since the period when these notices were drawn up, the subject to which they relate has excited a large share of attention; numerous essays have been published upon it, both in France and in this country, in which a large body of additional facts has been recorded, and many of the authorities quoted in these notices have been referred to: but in none of these essays does the writer find that the purpose which he had in view, that, viz., of giving a continuous narrative of the literary history of this interesting portion of surgical science, has been fulfilled. He is induced, therefore, to hope that, even at the present day, the following communication may be not without interest.

In attempting to bring into one continuous view the observations of practical surgeons relative to the occurrence of inflammatory affections of the internal organs after external injuries and surgical operations, I propose to notice, *first*, the occurrence of affections of the liver in cases of injury of the head; *second*, the occurrence of affections of other viscera and parts of the body, besides the liver, after injuries of the head; *third*, the occurrence of affections of the liver, and also of the other viscera and parts of the body in injuries of other parts than the head; and *lastly*, the occurrence of affections of the different viscera and parts of the body subsequently to surgical operations.

* From the Edinburgh Medical and Surgical Journal.

I.—*Inflammatory Affections of the Liver in cases of Injury of the Head.*

Even at so early a period of modern surgery as in the time of Ambrose Parè, (whose works were first published in 1561,) the occurrence of abscesses of the liver in cases of injuries of the head had attracted the observation of surgeons. "It is," Parè remarks, "to be observed, that abscess of the liver is frequently excited in cases of wounds of the cranium,—an occurrence which has lately been observed by myself, by Robert Greauve, Rector of the Medical Faculty of Paris, and by Binosque, a licensed surgeon, in three instances." (*Œuvres*, Lib. x., Cap. xii., p. 229, edit. Lyons, folio, 1652.) Parè particularly insists upon the fact, that the individuals who were the subjects of these observations were in perfect health previously to the reception of the injury of the head. "Et si tu m'objectes," says he, "que telle aposteme estoit ja concretée auparavant le coup donné; je respons que les patients, auparavant estre blesez, auoient une viue et naturelle couleur sans aucun signe d'estre hepaticques, et estoient bien habitez, faisans toutes leurs operations, ce que tu pourras voir par experience y prenant garde comme i'ay fait."

Since the times of Parè, the connection between injuries of the head and abscesses of the liver has been pointed out by a number of surgeons. Pierre Pigray, the pupil of Parè, whose *Chirurgia* was published at Paris in 1609, says, (in the ninth chapter of the fourth book,) that he has seen many persons who had been wounded on the head die without the occurrence of any alarming symptoms, particularly when fever occurred on the third day; and that, in almost all these fatal cases, he has found an abscess in the substance of the liver (p. 368-9). (*Epitome des Preceptes de Medecine et Chirurgie*, Rouen, 1658.)

Ballonius, in the appendix to his *Treatise on Convulsions*, (the *Approbatio* of which is dated 1638—Opera, Vol i., p. 368,) says, that he has heard that many surgeons have observed abscesses in the concave part of the livers of individuals dying in consequence of severe injuries of the head, but as to the truth of this he cannot himself offer any judgment.

Schenckius, in his *Exercitationes Anatomicæ*, (published in 4to. at Jena, 1652, p. 177,) states, that Virsungus had found from the examination of many bodies, that abscess of the liver is very liable to occur in individuals who have received severe wounds of the head, particularly of the temporal muscle.

Petrus de Marchettis, Professor of Anatomy and Surgery at Padua, mentions in his work entitled "*Observationum Medico-Chirurgicarum rariorum Sylloge*," (p. 35, edit. Amsterdam, 1665,) that he had frequently demonstrated both in the anatomical theatre, and in the Hospital of St. Francis, large collections of pus in the

cavities of the thorax and abdomen, and abscesses in the lungs, liver, and spleen, in individuals dying after injury of the head.

We are told by Phil. Jac. Sachs, in the *Miscellanea Medico-Physica Curiosa* for 1671, (Dec. i., An. ii., Obs. 119,) that he had been informed by Dr. Stadlender, that in at least three cases of injury of the head, he had found abscesses in the liver. In one of these cases—viz., that of an individual, a portion of whose brain escaped by a wound in the *os frontis* above the left eye, and who died on the 14th day,—it is mentioned that, eight days before death, the abundant secretion of pus from the wounds entirely disappeared.

It is stated by Velschius, in his “*Episagma Observationum Medicarum*” (Observ. 56,) that Paulus Marquardus Slegelius, (born at Hamburgh, 1605,) had observed all those who died of wounds of the head to complain, before death, of pain of the spleen or liver, and he had always found, on opening their bodies, abscess of the liver.

Schenckius, in his “*Observationes Medicæ Rariores*,” (folio, 1665, p. 411,) has quoted, “ex Thomæ Mermanni sereniss. Baviaræ ducis Archiatri Observationibus lectissimis,”* the case of an individual who, some months after having narrowly recovered from the effects of a severe wound of the head, fell into bad health. When Mermann was called to see him, he found him affected with jaundice, with slow fever, delirium, and wasting of the whole body, and on examining with his hand the region of the liver, he discovered that it was swollen and painful. After the death of the individual, no mark of disease was found in the head. The substance of the liver was almost wholly destroyed, and in place of it, there was found a quantity of putrid and purulent matter inclosed in a sac.

The second chapter of Meekren’s *Observationes Medico-Chirurgicæ*, (Amsterdam, 1682,) is entitled “De abscessu hepatis fracturam cranii secuto.” Meekren relates a case of this kind which had occurred to himself (p. 22, and again more minutely, p. 31). The individual, about twenty years of age, had received three wounds on the skull, one of which required the application of the trepan. On the 20th day, he was quite free from any symptom of fracture of the cranium. He then began to complain of pain in the region of the liver and stomach. The copious purulent secretion in the wound diminished much in quantity, and the bottom and lips of the wound became dry; violent fever and delirium came on, and he died on the 28th day. A small quantity of pus was found upon the *dura mater* below one of the wounds on the skull, and serum was effused at the basis of the brain. An abscess was found in the liver containing half a pint of pus.

Bonetus, in the fourth book of his *Sepulchretum Anatomicum*, (first published in 1679,) section 3, observation 16, entitled “He-

* I do not know whether Schenckius refers to Mermann’s *Consultationes et Responsiones Medicæ*, which were published by Thiermair at Ingolstadt, in folio, in 1675. Mermann himself died in 1612.

patis Abscessus in capite vulneratis non raro repertus;" and C. Stalpartius van der Wiel in his "*Observationum rariorum centuriæ posterioris pars prior*," observ. 3, (first published in 1687,) have collected most of the authorities on this subject to which I have hitherto referred. Some errors have crept into the quotations given by Bonetus from Ambrose Parè, Slegelius, and Ballonius, which have been pointed out by the learned and accurate Morgagni in the 22d paragraph of his 51st epistle.

Pacchioni, in his *Opusculum Anatomicum de Dura Meninge*, (Romæ, 1721,) has related (Opera, p. 63) two cases of injury of the head. In one of these, occasioned by a fall, the individual seemed to recover from the primary effects of the injury in a few days. Soon afterwards, however, slow fever came on, with acute pain in the region of the liver. On the fifteenth day, the trepan was applied, but only a few drops of pus escaped. Jaundice occurred on the sixteenth, and he died after repeated fits of shivering. Both tables of the cranium were found to be fractured at the place of the injury; the *dura mater* was externally semiputrid and livid. The brain and chest seemed quite healthy. The liver was immensely enlarged, of a dirty-black colour on its outer surface, where there were seen some tubercles "*tartaro plena*." The substance of the liver contained an abscess full of blood and pus. The gall-bladder was full of a bloody substance, and its membranes much thickened.

In Pacchioni's second case, the patient, a man 70 years of age, who had received a wound on the occiput, reached the eightieth day, without the occurrence of any bad symptom. The surgeon having attempted to remove a piece of bone that was sticking to the *dura mater*, the patient was suddenly seized with universal collapse and coldness of the different parts of his body; cold sweat, imperceptible pulse and pain in the intestines. There subsequently occurred pain in the right hypochondrium, and bilious vomiting, and he died on the third day of the attack. At the place of the wound, the *dura mater* was somewhat thickened on its outer surface, and a little serum was effused between it and the *pia mater*. The thorax was healthy. There was an abscess in the liver, which had burst and discharged its contents into the cavity of the abdomen.

The second part of the *Breslaw Collections* for 1724 contains (p. 430) some remarks upon the Sympathy of the Liver with the External Organs, by Behrens of Brunswick. He relates a case of injury of the head that was followed by the formation of nine abscesses in the liver.

Bianchi, in his *Historia Hepatica* (Geneva, 1725), alludes (p. 147,) to the occurrence of abscess of the liver after injuries of the head, with effusion below the cranium, as a well-known fact; and he mentions a case, which had fallen under his own notice, in which an abscess of the size of the fist was found in the liver of an individual dying two months after the reception of an injury of the

head. At another part of the same work (p. 360), he mentions that he had been informed by his colleague, Antonius Reina, that at the siege of Turin he had seen many become affected with abscesses of the liver after injuries of the head; and that in cases of severe contusions from mortar-shells, though unaccompanied with laceration, these abscesses occurred before the acute stage of the disease was over, and hurried on the death of the patient.

We are informed in the last of "*Tres historię medicę*," recorded in the first part of the second volume of the *Commentarii Bononienses* for 1745, that Molinelli, who was Professor of Medicine and Surgery at Bologna, having had his attention particularly directed to the occurrence of abscesses of the liver, after injuries of the head, examined the bodies of a number of individuals who had died of such injuries. The results of his examinations were, that these abscesses occur in the convex as frequently as in the concave part of the liver, and that the matter sometimes stagnates in other parts of the body, the liver remaining sound; but it is always, he alleges, in some part of the abdomen that this takes place. In one remarkable case of injury of the head, in which the abdomen began to swell at the same time that the process of suppuration ceased on the external wound, he found the surface of the intestines, particularly of the small ones, covered here and there with small ulcers, and a great number of tubercles. In some individuals dying of injuries of the head, a considerable time after their reception, the liver and other viscera were found quite healthy. On the other hand, in individuals who had received wounds, or who had ulcers, on other parts of the body than the head, he found collections of purulent matter in the liver.

M. J. L. Petit mentions, in regard to the wounds of the head which he had occasion to see at Courtray, when along with the army, that in all the cases of erysipelatous inflammation following on such wounds, in which suppuration did not take place, the patients died. In these individuals the wounds became dry; their borders were flabby. No mark of disease was found within the cavity of the cranium, not even below or opposite to the wound; but on examining the liver, inflammation and abscess were constantly found there—an accident, he remarks, pretty frequent in wounds particularly those of the head.—*Traité des Malad. Chirurg.*, i. 45.

In the 9th volume of the 12mo. edition of the *Memoires de l'Acad. de Chir.* 1757, p. 130, there is an Essay by M. Bertrandi, Professor of Surgery at Turin, published both in French and in Latin, the latter copy being entitled "De Hep. Absc. qui vulneribus cap. superveniunt." Bertrandi states that he had observed in cases of injury of the head, abscesses to form both on the surface and in the substance of the liver. He likewise states that he has seen persons who seemed to have entirely recovered from wounds which they had received on the head, and who, on account of some derangements in the animal functions, had passed under the care of a physician, become yellow, be affected with difficulty of breathing, with

or without pain, void brick-coloured urine and purulent dejections, and, after these symptoms had continued for some months, die in a state of exhaustion and marasmus. In these cases he has never found on examination after death any change of structure besides suppuration of the liver.

Mr. Batting, in his *Chirurgical Facts relating to Wounds and Contusions of the Head*, &c. Oxford, 1760, has published a case (Observation ix., p. 46) of contusion of the head with separation of the lambdoid suture, which was succeeded by a suppuration of the liver. The patient was seized on the 10th day after the injury with cold shiverings, succeeded by fever and great pain in the head, and died six days afterwards. A portion of *dura mater*, at some distance from the external wound, was inflamed and tending to putrefaction.

M. Richard de Hautesierck, in the sixth chapter of his *Recueil d'Observations* (4to. Paris, 1772), remarks (vol. ii., p. 329), that in injuries of the head, particularly when accompanied by effusion, the liver, being sympathetically affected, often becomes inflamed, and sometimes suppurates, and seems always to have participated in the violence of the commotion. He has related a case furnished to him by M. Betheder, of a woman who, having fallen on her head, suffered great pain in that region, and, on the following day, in the left shoulder also. The pain in the left shoulder passed soon to that of the other side; she gradually became yellow, and suffered from nausea and bilious vomiting; but these symptoms disappeared under the use of purgative medicines. This case, M. Hautesierck observes, proves that though the liver frequently becomes diseased in cases of wounds of the head, the suppuration of this viscus is not a necessary effect; that it does not happen in all cases, and that it is frequently replaced by a less dangerous jaundice.

In another case of fall on the head, which is related in the same work, by M. Vernueil, (p. 354,) the symptoms seemed to be subdued by the remedies employed, when, after some imprudence in respect to regimen committed by the patient, "la fièvre se mit de la partie," manifest symptoms of inflammation of the chest showed themselves, accompanied with delirium, lethargy, and a dull pain in the region of the liver. The patient died on the fourth day of this attack. No effusion was found within the cranium, but suppuration had occurred in the lung, which was adherent to the pleura, and in the liver. It is remarked that this individual's lungs had previously been very delicate.

The only case I can find in Mr. Dease's *Observations on Wounds of the Head*, (Dublin, 1776,) in which there is reason to presume that an affection of the liver had occurred, is the eighth, in which the patient, who had frequent shiverings both previously and subsequently to the application of the trepan on the nineteenth day, became all over yellow, as if jaundiced, and died on the twenty-second day. But no notice is taken, in the dissection, of the state of any parts besides the contents of the cranium.

M. Quesnay, in his "*Observations sur le Trepan dans les cas douteux*," (contained in the first volume of the Memoirs of the Academy of Surgery,) has related one case of injury of the head in which an abscess formed in the liver (p. 322, 12mo. edition). In this case there occurred hemorrhage from the nose and ears, on account of which very active blood-letting was practised. On the seventh day, the patient was seized with bilious vomiting and fever, but this diminished under the repetition of venesection. On the eleventh day, in consequence of great pain of head, deep, but interrupted stupor, and irregular shiverings, the trepan was applied and a spoonful of blood, extravasated below the *dura mater*, was evacuated. Repeated venesection (once from the foot) was practised; but pungent pain in the right hypochondrium supervened, and fever followed by irregular shiverings, which led to the suspicion of abscess of the liver. The patient fell into a state of lethargic stupor, and died on the seventeenth day. An abscess was found in the substance of the large lobe of the liver.

In the sixth volume of Richter's *Chirurgische Bibliothek*, (1782, p. 722,) is related a case of abscess of the liver, supervening to a wound of the head, by Dr. Michaelis of New York. In this case, the operation of trepan was performed on the nineteenth day after the reception of the injury, the patient having followed his usual occupations during most of the intervening time, notwithstanding violent pains below the seat of the injury. A portion of the inner table of the skull was found detached and lying on the *dura mater*, for the removal of which and other splinters, the trepan was repeatedly applied. On the eleventh day after the operation, he had an attack of tertian fever, which yielded, within fourteen days, to the ordinary means. In the fifth week, he was seized with a stitch in the side, which was removed by bleeding and blistering. But in the sixth week, a painful swelling in the region of the liver showed itself, soon followed by fluctuation. On this swelling being opened, more than a pint of purulent matter was discharged. Nothing remarkable occurred in the progress of cure.

I do not find that Mr. Pott, in his "*Observations on the Nature and consequences of those Injuries to which the Head is liable from external violence*," nor Mr. Abernethy, in his "*Surgical Observations on Injuries of the Head*," make any allusion to the occurrence of abscesses of the liver. Their dissections, indeed, never extend beyond the cranium. In "*Some Histories of Wounds of the Head*," by John Williams of Redruth in Cornwall, (Falmouth 1765,)" there seems to be no mention of hepatic symptoms or affections, and Mr. Samuel Cooper in his *First Lines*, (i. 397,) after referring to cases of this kind recorded by foreign surgeons, remarks, that "inflammation and abscesses of the liver, in consequence of injuries of the head, have not been so often noticed in this country."

Having sufficiently established, by a reference to authorities, the fact, that the liver frequently inflames and suppurates in cases

of injury of the head, it will be proper to take some view of the explanations of this phenomenon which have at different times been proposed.

The explanation offered by Ambrose Paré need not detain us long. Nature, according to him, offended by the great severity of the blow, withdraws her powers and virtues, viz., the blood and spirits, from all parts of the body to the heart and liver, in the latter of which viscera, they, in consequence of their superabundance, excite fever and phlegmonous abscess. “La cause de ce peut estre que nature se sentant offensée par grande vehemence du coup, collige et retire a son secours ses forces et vertus de toutes les parties du corps (qui sont le sang et les esprits) vers le cœur et le foye; ainsi que voyons en peur et crainte, e adonques fait inflammation au foye, &c. Ou si tu aimes mieux dire avec Monsieur de la Corde, que nature succumbant sous le faix du mal vient a renvoyer une partie de ceste matiere purulente avec le moins d'incommodité qu'il se peut au foye par les veines: et qu' ainsi soit, tous ceux ausquels une aposteme se fait au foye le cerveau blessé, meurent.”—Ambrose Paré, *Œuvres*, Lib. xvi., chap. xii., folio edit., Lyons, 1652, p. 229.

Pigray attributes the formation of abscesses in the liver and mesentery, in cases of wounds of the head, to the sympathy and association of parts, on account of the nerve coming from the sixth conjugaison. If the abscess be in the mesentery, it may be discharged by the intestines; if in the liver, it produces continued fever and death.

Ballonius, though he does not seem to have been quite sure whether the phenomenon ever actually takes place, thought that in case it does, he could furnish an explanation of it. He rejected the opinion of some, that the pus spreads from the brain to the liver by continuity of membrane; and, taking for the foundation of his theory the observation of Galen, that, in injuries of the brain and its membranes, the secretion of bile is greatly increased, he concluded, that, if the evacuation of this increased quantity of bile be obstructed, it will stagnate in the concave part of the liver, and there produce inflammation and abscess. He deduces as a practical rule, from this theory, the propriety of administering purgatives in cases of injury of the head, to carry off the superabundant bile.

“Observavi sæpissime,” says de Marchettis, “quod quando in his vulneribus (capitis), collum incipit dolere, parte potissimum postica, et laterali, tunc materia purulenta delabitur ad thoracis et abdominis cavitatem, quæ longiori mora cum pulmones, tum pleuram, aliquas nempe ipsorum partes erodit, ex quibus multa sanies emanat, quæ postmodum ad abdomen defluit, cum jecoris et lienis labe, in quibus varias pustulas excitat; quibus disruptis, perinde ac ex pulmonibus, et pleura, ita et ex his materia purulenta effluit; quanquam hujus observationis ignari, existiment, abscessus, abortos in his partibus, quorum ratione patientes moriuntur,

non ex capitis vulnere quod ex capite copiosum pus posse ad inferna viscera delabi non sibi persuadeant: prout in plerisque observavi, mediam thoracis, et abdominis cavitatem pure fuisse refertam."

Slegelius, we are informed, attributed the phenomenon in question to transumption of pus, from having observed that the external wound always became dry at the time that abscess began to be formed in the liver. The disappearance of suppuration on the external wound, he consequently regarded as a most alarming symptom.

Meekren has published, in the work already referred to, letters which passed between himself and Barbette and Zas, two Dutch practitioners, relative to the following question; "Since not unfrequently injury of the cranium and brain is followed by suppuration of the liver, it is asked by what routes the purulent matter is conveyed from the brain to the liver?" Meekren alludes to the support which the opinion, that purulent matter passes through secret ways from the head to the liver, derives from the cessation of suppuration in the seat of the primary injury; and also mentions the opposite opinion entertained by some, that the occurrence of abscesses in the liver in cases of this kind is owing to a morbid constitution of that viscus.

Barbette does not admit the theory of the purulent matter being conveyed from the head to the liver. He thinks that the local injury of the head occasions putridity of the blood, which is in consequence partially converted into purulent matter, and he assigns what he regarded as satisfactory reasons why the liver only, and none of the other viscera, becomes the depository of the purulent matter that is circulating with the blood.

The individual case of abscess of the liver after injury of the head, described by Meekren, Zas is disposed to regard, from the circumscribed character of the abscess, as the consequence of some contusion or injury of that viscus. He allows, however, that abscesses of the liver may follow injuries of the head, and seems disposed to attribute them to a sympathy maintained by the membranes, which he regards as expanded nerves.

Bianchi supposed that, in cases of this kind, the purulent matter is absorbed from the wound, and circulates along with the general mass of the blood, and that the liver receives the largest portion of it only from its being larger than any of the other viscera; from the course of the fluids through it being of greater extent; from the fluid it secretes being more viscid, and its vessels, consequently, better fitted to permit the filtration of purulent matter through them; and from its possessing no muscular power by which it can return the purulency that accumulates, into the circulation.

M. Bertrandi rejects the doctrine of nervous sympathy, as explanatory of this class of cases on the ground, that, if the phenomena depended on nervous communication, the parts which are supplied with nerves from the same source should be affected

equally with the liver. He rejects also the theory of metastasis, since abscess of the liver occurs in some cases of apoplexy, coma, and other diseases of the head, not accompanied by suppuration; and he is disposed to refer the phenomenon entirely to derangement of the circulation of the blood. In cases of injury of the head, in which abscess of the liver is chiefly to be feared, there are, he conceives, manifest symptoms of increased determination of blood to the head; the increased quantity of blood returning by the descending *vena cava* will retard the flow in the ascending cava, and this, he imagines, will chiefly affect the hepatic branches. The stagnation thus produced gives rise to inflammation and suppuration. M. Bertrandi's *theoria morbi* leads him to conclude that blood-letting practised at the foot, will still farther retard the motion of the blood in the ascending cava; and he states that he has more than once, in cases of this nature, seen patients become suddenly yellow, from jaundice supervening upon blood-letting thus practised.

A memoir, by M. Andouillè which immediately follows that of M. Bertrandi in the *Memoires de l'Academie* (p. 168), consists chiefly of cases in confirmation of Bertrandi's theory of hepatic venous stagnation, and corroborative of the impropriety of bleeding from the foot, which he founded upon that theory.

The forty-fourth volume of the *Journal de Medecine* for 1775 contains a criticism on Bertrandi's Memoir, by Dr. Morin of Arranches. The object of Dr. Morin's Essay is to show, 1st, That besides the general sympathy which exists betwixt all parts of the body, each organ possesses a peculiar sympathy; 2d, That the doctrine of metastasis "ne doit point etre admise comme une simple hypothese;" 3d, That the circulation of the blood, after blows on the head, is not affected in the way M. Bertrandi supposes; since the effect of an injury of the head is to diminish, not to increase, the flow of blood to the head; and therefore the quantity of blood flowing to the lower extremities, and, consequently, to the liver, is increased; 4th, To prove the doctrine of revulsion and derivation.

M. Pouteau has likewise discussed at some length the theory of M. Bertrandi, in a "Memoire sur les Abcès qui se forment a l'occasion des plaies de la tête," to be found at p. 111 of the second volume of his *Œuvres Posthumes* (Paris 1783). The following are the conclusions to which M. Pouteau is led:

1st, Blows on the head, if of sufficient severity to derange the organization, render the passage of the blood, from the arteries into the veins and sinuses of that part, more difficult.

2d, The ramifications of the inferior aorta are overloaded with all the blood which in the state of health passes from the arteries into the veins of the head.

3d, The suppurations which occur, in consequence of these injuries, in the lungs, the intestines, and other viscera of the abdomen, and particularly in the liver, are not occasioned by the ob-

struction of the veins of those parts, but by the distension of the arteries.

4th, Bleeding at the foot, by determining a greater column of blood into the inferior aorta, may increase the obstruction (*embarras*) already existing in the branches of that artery, and may, in particular, accelerate the inflammation and suppuration of the liver.

Mr. Cheston, in the 2d section of the third chapter of his "*Pathological Inquiries and Observations*," (Gloucester, 4to., 1766,) treats of abscesses of the liver attendant on fractured skulls. Mr. Cheston is not disposed to admit the doctrine of metastasis in explaining cases of this nature. "If," says he, "instances can be produced wherein matter has been found in no small quantity in the liver, when very little if any appearance of suppuration has been observed within the cranium, we must at least allow that abscesses may exist in the liver, without being derived or occasioned by falling from this part to that abdominal viscus." He then proceeds to detail a case in illustration of this opinion (p. 36).

Mr. Cheston further conceives, that the explanation of this class of cases upon the theory of metastasis is untenable, because, as he alleges, in cases of translation of matter, there is little appearance of inflammation, the matter being rather disseminated through the viscus on which it falls, than collected in one or more large vomices. The hardened inflammatory state in which the liver is found in cases of injury of the head proves, therefore, that the cause is confined to this part alone.

It would appear from the remarks which Mr. Cheston makes on Bertrandi's theory, that he had either not read or not understood him. He himself thinks it most probable, that, in cases of this nature, the functions of the liver are injured by a sympathetic irritation of its vessels and neighbouring parts, from a diseased state of the brain; and that in consequence of this derangement of the hepatic function, of which the vomiting and increased secretion of bile are sufficient proofs, such obstructions may be formed as will afterwards terminate in suppuration. He is disposed to think, also, that the shock which the body must receive, in many cases of injury of the head, may, from the size, as well as from the soft, pulpy texture of the liver, affect the functions of that viscus in particular, and thereby not a little assist in confirming those obstructions, which afterwards could not be terminated but by suppuration.

Bichat, in his exposition of Desault's doctrines on wounds of the head, after alluding to the different explanations relative to the formation of abscesses of the liver in consequence of such injuries, says, "Let us confine ourselves to what strict observation demonstrates, viz., 1st, That there exists an unknown but actual sympathy between the brain and the liver, which is closer than any that exists between the other viscera; 2d, That in consequence of this sympathy, affection of the brain almost always produces some alteration in the functions of the liver, as is shown in the dead body, by its being

found gorged with blood, inflamed, and containing abscesses; and in the living subject by nausea, bilious vomiting, &c. This sympathy is not confined to the brain itself, for the internal and external coverings of this organ likewise participate in its influence." The circumstance of the formation of abscesses of this nature being confined to the liver, satisfied Bichat that they do not depend on general succussion of the body, but that the nervous system is the principal agent of communication, on which the circulation acts only indirectly.

Schmucker has remarked, that the explanation of Bertrandi, which attributes the suppuration of the liver frequently found after wounds of the head, to a determination of blood to the head, and an interrupted circulation and consequent stagnation in the large vessels, corresponds best with his observations, for in most *post mortem* examinations he has found the vessels of the head much dilated, and particularly the longitudinal sinus obstructed by polypous growths. (*Chirurgische Wahrnehmungen*, Erster theil, p. 161.)

M. Richerand (*Nosographie Chirurgicale*, ii. 227, edit. 1808,) conceives that the formation of abscesses of the liver after injuries of the head depends on the general shock which the body receives in accidents of this nature, and in which the liver participates. The great size of this organ, its weight, the manner in which it is fixed in its place, and its soft and easily lacerated parenchymatous structure, appear to him sufficient to explain why it is more liable to suffer than any other organ, in injuries of this nature. In support of his views on this subject, M. Richerand has mentioned some cases in which individuals whose skulls had been fractured in consequence of their falling from a height, and who died within twenty-four hours after the accident, were found to have their livers also lacerated. He alleges that, when no general shock has been communicated to the body, wounds of the head are never followed by abscess of the liver. M. Richerand caused about forty dead bodies to be precipitated from the anatomical theatre, at the Hospital of St. Louis, into the dead-room below it,—a height of about eighteen feet—through an aperture in the floor of the former, by which these two rooms communicate. The brain and the liver were, he says, always more or less injured, the latter presenting, in some instances, lacerations of considerable depth. No viscus, he continues, without excepting even the brain, suffered more than the liver from the violent commotions produced by the fall. M. Richerand regards this explanation of his as "*absolument nouvelle*." I shall leave it to those who delight to humble the pride of aspirants to originality, to determine how far the theory is anticipated by Mr. Cheston in the passage I have quoted from him (p. 403).

M. le Baron Larrey, in the fourth volume of his *Memoires de Chirurgie Militaire*, p. 213, combats the opinion advanced by M. Richerand, and endeavours to show, (p. 238,) 1st, that abscesses of the liver following wounds of the head are very seldom produced

by a direct concussion of the liver, either from the individual having fallen on the right hypochondrium, or from some hard substance having struck that part of his body; 2d, that these abscesses occurring after wounds of the head are owing to a sympathetic irritation which the liver receives from the inflammation established in the fibrous membranes of the cranium, or of the bones of the upper and lower extremities, particularly of those of the same side; and to the metastasis towards the same viscus of ichorous miasmata, or of a more or less subtle fluid; 3d, that it appears that the communications of the morbid principles of the injured parts with the hepatic organ, take place most easily when they have not to cross the median line of the body, which means, I presume, that the inflammation of the liver is generally in the right or the left lobe, according as the injury is on the right or left side of the head.

M. Larrey thinks that, in the cases mentioned by M. Richerand, where fracture of the cranium and laceration of the liver were simultaneously produced by a fall, they were the effects of separate injuries, and might have existed separately. He records an example of death being produced by laceration of the liver, in consequence of a fall on that region, without either the head or the integuments of the abdomen being injured; and he alleges, that, in many instances of violent falls followed more or less immediately by death, the cranium and membranes have been found severely injured without the liver having suffered. He relates three cases of severe falls, in all of which the head was injured; yet neither in two of the patients who died was there any appearance, nor in the third who survived was there any symptom, of the liver having suffered. M. Larrey has likewise related three cases of sabre wounds of the cranium received in duels, in none of which did the individuals fall on receiving the injury, yet they all died affected with abscess of the liver.

The only other topic connected with the occurrence of abscesses of the liver subsequently to injuries of the head, to which we have to advert, is, the question how far this occurrence is attended by any symptoms calculated to warn the practitioner that it is in progress?

Marchetti had observed the posterior and lateral part of the neck to become painful at the time he supposed the translation of pus to be going on. This symptom has received from other authors almost as little credit as the explanation by which it was accompanied. "Other authors," says Mr. Cheston, "who have taken notice of this complicated disease, have never once mentioned this symptom, unless from Marchetti, which surely is too remarkable to be overlooked or forgotten." Mr. Cheston states, however, that it is not unusual for patients who have received any violence, by a fall or other accident, on their head, if not thereby rendered insensible, to complain, soon after the injury, of a pain in the top of their shoulder as well as above the scapula; this pain he attributes to the violent shock communicated immediately to the neck and parts adjacent.

M. Pouteau is of opinion that the pain observed by Marchetti was merely produced by nervous irritation, which propagated itself on this in a more obvious manner than on a hundred other occasions. The patient whose case is related by Mr. Batting had, at the very beginning of the disease, the symptom which Marchetti says generally indicates a metastasis of purulent matter to the thorax or abdomen. "Whether," says Mr. B., "it be in fact a common antecedent, future observation alone can determine, as writers since his time have not observed or attended to it."

In many instances, the first information that is obtained of the existence of abscesses in the livers of those who have suffered injuries of the head, is derived from examination after death.

M. Bertrandi states that abscesses in the liver following wounds on the head most frequently form without their being perceived; and this he considers the less remarkable that idiopathic inflammation of the liver is very rarely discovered. "The formation of these abscesses," says M. Pouteau, (p. 122-3,) "frequently does not announce itself by any troublesome symptom, and when there is reason to suspect their existence, it is too late to remedy it."

Morgagni remarks, *Epist. li. § 22*, that when there occur certain symptoms of hepatic affection, and the wound becomes suddenly dry, yielding less pus than it should do, we may suspect translation of the pus to the liver, but we cannot rely on this with certainty.

According to Bianchi, the principal mark of approaching abscess of the liver is to be found in the circumstance of the primary inflammatory affection showing an indisposition to yield to remedies. He states that he has always observed in individuals becoming affected with abscess of the liver, from a few to a hundred days after having received an injury on the head, the symptom to which Hippocrates alludes in the following prognosis;—"Qui multo tempore tenues et crudas mingunt urinas, si cætera ut evasuris adsint signa, hos ad regiones infra septum transversum abscessum expectare oportet."

"The diagnostic symptoms," says Mr. Cheston, "of an injured liver tending to suppuration, will be then in general evident to a careful observer, and may be known by a pain in the abdomen about the right hypochondrium, bilious vomitings, irregular shiverings, sallow countenance, and a swollen, tumid belly, attended with a more or less remarkable fluctuation of water. Sometimes, when the inflammatory symptoms run high, the patient is attacked with a burning fever and insatiable thirst, in which case a delirium generally precedes his dissolution." p. 43.

II.—*Affections of other organs than the Liver in Injuries of the Head.*

But the liver is not the only organ which in cases of injury of the head is liable to inflame and suppurate, as in fact we have

already had occasion to conclude from the observations of Marchetti and Molinelli.

Notwithstanding that Molinelli was led by his experience to believe that these secondary effects of injuries of the head always occur in abdominal viscera, we find that they have not unfrequently been observed in the viscera of the thorax.

Nich. Massa mentions (in his *Anatomiae Liber, Introductorius*, cap. 28) that, in 1533, there occurred to him a case of injury of the head, in which, upon dissection, he found a large quantity of purulent matter in the cavity of the thorax, and an abscess on one of the lungs, an ulcer on the exterior surface of the left auricle of the heart, and an abscess in the right ventricle. This patient had not suffered pain, nor been affected with cough.

Valsalva, as we learn from Morgagni, (*Epistle* li., Section 22,) though he had scarcely ever seen abscess of the liver supervene upon injuries of the head, had in a number of cases observed these injuries to be followed by inflammation of the cavity of the chest and of the lungs.

Several cases of inflammatory affections of the contents of the chest, succeeding to injuries of the head, are narrated by Morgagni, Lib. iv., *Epistle* li., Section 17. Case of injury of the head, fatal on fourteenth day. Purulent matter found between the *dura* and *pia mater*; hardish tubercles here and there in the lungs, some of which yielded *sinceram sanie*m; the respiration became laborious some days previous to death.

Section 18. Similar case; patient lived to the twenty-fifth day. The lungs were very red, and small abscesses were found in them.

Section 19. Similar case; patient lived two months. Abscess in the brain; many abscesses and tubercles in the lungs.

Section 20. Blow, without fracture; no disease of brain found; both sacs of pleura filled with purulent matter; lungs studded with tubercles, some in a state of suppuration.

Bertrandi was aware that the lungs are sometimes affected after injuries of the head, for he expresses his conviction that his explanation of the mode in which inflammation is produced in the liver is equally applicable to the lungs, conceiving that in the cases of this nature, in which these organs become diseased, a derangement in the motion of the blood is produced by the meeting of the two *venæ cavæ* in the right auricle.

Delaisse, in his *Recueil d'Observations de Chirurgie*, Paris, 1753, mentions (39e. observ., p. 181,) a case of severe fracture of the head, in which the arm also was fractured. Everything went on well till the sixteenth day, when secondary fever occurred, and along with it, a frequent cough, accompanied with difficulty in breathing. On examining the body after death, everything was found quite healthy within the cranium. On cutting into the lungs, there escaped a large quantity of purulent matter, of such a colour and consistence, it is remarked, as could be desired in necessary suppurations.

Schmucker, in his celebrated work on injuries of the head, (*Chirurgische Wahrnehmungen*, 1er theil. Berlin, 1774,) has related a case (4te. beobachtung, s. 55,) of a wound in the right parietal bone, of which the patient died on the twenty-ninth day after the injury. In this individual, besides an effusion of purulent matter in the longitudinal sinus, and on the surface of the brain, there were marks of extensive inflammation of the pleura, and a number of small abscesses in the lungs. The external convex surface of the great lobe of the liver was inflamed, and its vessels dilated with stagnated blood.

In Mr. Dease's fifty-sixth case, (p. 264,) although no symptom of pulmonary affection appears to have occurred during life, it was found, on dissection, that the posterior part of the left lobe of the lungs was heavy and dense, and when cut into, there issued a purulent viscid serum; the right lobe adhered firmly to the pleura, and could not be detached from it but by force; posteriorly and superiorly it was dense, heavy, and looked like the substance of a child's liver, and was certainly much inflamed; when cut into or torn, a purulent sanies issued out. As, says Mr. Dease, (p. 261,) there was no matter to absorb, it accounts for his not having had any irregular shiverings. In all appearance, the inflammation of his lungs took place the last days of his illness.

In some cases, subsequently to injuries of the head, collections of purulent matter have formed in the joints and adjacent textures.

In the twenty-second case related by Mr. Dease, that, viz., of a man, twenty-one years of age, who had received a wound on the head, which divided the first table of the left parietal bone for about an inch and a half, the patient became affected with shivering at the end of a fortnight. This continued irregularly for a fortnight, when he complained that his left leg was a little heavy to him, and on examination fluctuation was discovered above the knee. There had been no previous inflammation, nor did he ever complain of soreness, and the skin was not in the least discoloured. An ample incision having been made, nearly a pint of well-conditioned matter was discharged. About eight days afterwards, it was necessary to make a counter-opening under the ham, there being a large discharge from below. Two days after this, there appeared a tumour over the left clavicle, and, on this being opened, a quantity of white, tenacious matter, that seemed, it is said, to come from the thorax, was discharged. Mr. Dease regards this case as an example of translation of matter from the head to the knee and clavicle.

The following case occurred in the Royal Infirmary of this city, under the care of the late Dr. Brown.

Jan. 9, 1807. John Allan, aged 67, labourer in a distillery. The integuments of the cranium of the head, and for a considerable way around in all directions, are of a natural colour, but painful to the touch, and slightly œdematous. Over the posterior extremity of the left parietal bone, near the cranium and coronal suture, there is a more regular and slightly prominent swelling, with an opening at

its middle, which admits a probe for some way below the integuments. Complains of constant slight nausea; aching pain along the scalp, sometimes extending above the right eye, the lower eyelid of which is a little reddish, and slightly œdematous; frequent shivering, and extreme sensibility to cold; some thirst; little appetite; bad sleep; belly slow; tongue white; surface apt to be warm. This affection is the consequence of a blow on the head, by a bucket falling from the height of fifteen feet on the 1st current. He remained insensible for a few minutes after the accident, and it was half an hour before he could walk home. A small wound at the opening described, bled a little; he never vomited, but says the nausea followed next day; the right side of the neck feels a little tender; and the affection of the scalp has been gradually extending. He has been twenty-three years in a distillery, but has lived pretty regularly.

The sinus being laid open at admission, and the purulent matter evacuated, it was found necessary by a deeper incision to give vent to another collection of matter betwixt the pericranium and bone, the latter feeling rough, but neither moveable nor unequal, though, from the thickness of integuments at the part, it had something of a depressed feel.—*Admovr. vulneri Cataplasma Emolliens. Habt. Pulv. Jal. Comp. ʒi. et Infus. Sennæ ʒiii. post horas ii. si opus.*

10th. Passed a tolerably good night, and is much better to-day; less tenderness of scalp, and wound cleaner; copious alvine evacuation from the senna; pulse about 90.—*Sumat cras primo mane Infus. Sennæ ʒiii. repr. ad ʒii. post horas iii. si opus.*

11th. Was rather uneasy in the night; less pain in the integuments of the head, which, however, are still œdematous; pulse 92; tongue white; one dose of infusion taken has operated scantily.—*Capt. statim Pulv. Jal. Comp. ʒi.*

12th. Slept ill from pain of his right knee, which is swelled; sore on the head clean; no headache; tongue white; pulse 84.—*Admovr. Hirudines vi. genu, et repetr. Pulv. Jal. cras mane.*

13th. Was restless and somewhat delirious in the former part of the night. A large collection of matter in the neighbourhood of the sore was opened to-day by an incision two inches in length. Pain and swelling of the knee still troublesome; pulse 82; tongue white; no stool.—*Capt. Infus. Sennæ ʒii. Repetr. 3tia quaque horâ ad alv. solutionem.*

14th. Copious alvine evacuation; was again restless in the former part of the night, and somewhat delirious, but is quite distinct this morning; complains much of pain in his knee; copious discharge of rather thick, fœtid matter from the wounds.—*Admovr. genu Fomenta tepida; sumat mist. sal. ʒi. 3tia quaque horâ. Common dressing.*

15th. Passed a better night; discharge continues, but sores look rather sloughy; knee rather more swelled; pulse about 84; no stools.—*Sumat Infus. Sennæ ʒiii. mist. salin. u. a.*

16th. Was restless during the night, and is still a little indistinct; copious discharge of thick, tough matter from the sore, and an extensive portion of the cranium bare; swelling of knee greater, more diffused, and doughy; pulse 96, rather feeble.—*Omittr. mist. Salin. Habt. vin. rub.* \bar{z} viii.

17. Still somewhat indistinct; great discharge of matter from the head, to facilitate which one of the former incisions was carried backwards through the detached integuments; swelling of knee continues, and fluid can be made to fluctuate under the patella.—*Continr. vinum. Habt. Ser. vinos.* \bar{z} iii.

18th. Slept some in the night, and seems quite distinct to-day; a small artery of the scalp required a ligature; wound gives a copious foetid discharge.—*Continr. vinum ad* \bar{z} x.; *alia u. a.*

19th. Debility increasing, and swelling extending over the whole leg; a large portion of the cranium is bare; no stool for two days.—*Injicr. Enema vespere. Continr. alia.*

20th. Died last night.

Dissection.—On removing the integuments from the cranium, the abscess was found to be very extensive, covering externally to the pectanium, part of the frontal, parietal, temporal, and occipital bones. In the central part of the abscess opposite the incisions, the pericranium was sloughy, and detached from the sagittal half of the parietal bones for a space of about five inches in length and four in breadth. The surface of the bone was a little rough, but neither discoloured nor unsound, and the *dura mater* adhered everywhere to the inner surface of the cranium. The brain and its membranes were sound.

A serous effusion had taken place in the cellular substance of the right leg, particularly about the knee; externally the inferior extremity of the *vastus externus* was prominent, dark-coloured, and soft; when cut into, it was found to contain an abscess, which extended four or five inches upwards in the body of the muscle, and downwards for about two inches on the outside. The joint was found to contain much purulent matter, which came in part from the other abscess or bursa above the patella. The synovial membrane lining this bursa, the joint, and crucial ligament, had a dark-red colour, an extremely vascular, and somewhat of a flocculent, appearance. The cartilages had lost their usual bluish tint, and were of an ash-gray colour in general; very thin in some parts, exposing the bone, which was smoother, as if covered with synovial membrane.

Klein of Stuttgart, in his *Chirurgische Bemerkungen*, (12mo. 1801,) mentions (p. 136), that he has found after injuries of the head, alteration of the spleen much more frequently than of the liver.

Dr. Hennen, after pointing out that in a particular case "the sympathy between the brain and liver was strongly marked, and took place at a very early period," observes; "The sympathetic

affections occurring in cases of injury of the head vary in the organs which they attack and in the degree of violence. In the thorax, they appear, from simple increased secretion from the lungs, to tubercles and extensive purulent formation in their substance. Serum is also often found in the cavity, and very frequently in the pericardium; and even in the heart itself abscesses have been discovered. In the liver, morbid appearances are found throughout every shade of affection of its membranes or its secretion; either pain and tumefaction, with bilious diarrhœa, or the same with a perfect torpor of its functions; and inflammatory affections from increased vascularity to the formation of extensive collections of matter. In the spleen, pain, tumefaction, hardness, and abscess are occasionally observed. The stomach suffers more frequently than any other organ; but it appears to be more from general nervous sympathy than from any organic affection, which is seldom discoverable on dissection."

III.—*Affections of the Liver and other Organs in Injuries of other parts than the Head.*

But injuries of the head are not the only species of injury which is liable to be followed by the formation of abscesses in different parts of the body.

Ballonius relates that he had found an abscess in the liver of an individual who had been wounded with a dagger about the false ribs, though the wound did not penetrate to where the extremity of the diaphragm reaches. "Whence," he asks, "did this arise? Perhaps in the same way as in wounds of the head."

M. Goursaud, in his Essay on *Metastasis*, (which gained the prize of the Academy of Surgery in 1751, and which is to be found in the sixth volume of the 12mo. edition of the *Prix de l'Academie*, p. 3,) has related two cases in which abscesses were found in the liver after death, supervening in one case to a wound of the little finger with a sword, and in the other to a blow on the upper part of the right tibia, which produced only a slight contusion.

In the first of these cases, it is mentioned, there came on convulsive movements through the whole arm; and fever and swelling of the part speedily manifested themselves. The patient was bled repeatedly without any advantage. At the end of three days, he felt a dull pain in the right hypochondrium. The convulsive motions and swelling not diminishing, his finger was cut off, with beneficial results as regarded these two symptoms; but the fever always continued, and the patient died at the end of twenty days. On opening the body, there was found a demi-septier of pus in the proper substance of the liver, with a considerable loss of substance. The wound suppurated very little during the latter days of his life.

In the second case, the patient was seized on the tenth day of the accident with a considerable degree of fever, and died five days

afterwards. The abscess found in the liver is said to have been pretty considerable.

"These observations," says M. Goursaud, "show us how much wounds in which the nervous system is affected, particularly at its origin, are subject to suppression of suppuration, and may give rise to the formation of different deposits interiorly. In these cases the animal spirits are not distributed in the different parts with freedom, and it often happens that their quantity is even diminished; in these cases the functions of the viscera are deranged, and the vessels which, from their structure, have less resort; a circumstance that may give occasion to obstructions, and be a second cause of abscesses in the different parts."

"I have seen several times," continues the same author, "abscesses, the matter of which formed and decided, had reëntered into the circulatory system without producing any bad consequence. We know that the pus which reënters into the mass of the fluids, if it be not of a bad character, may circulate there for some time without altering it. And even in the case of its being vitiated, it would not form at once a deposit. Subjected to the laws of the circulation, and distributed throughout all parts of the body, it might at most, after several repeated circulations, deposit itself on some part, and there occasion inflammation." p. 15-16.

"La metastase ne peut donc pas se faire subitement, ni produire tout a coup ces absçés que l'on regarde comme les suites de cet accident; car, pour que l'humeur purulente qui rentre dans les voies de la circulation, et qui se depose sur quelque partie, puisse y former un absçés, il faut qu'elle y produise une inflammation et qu'elle parcourt les memes temps que celles qui arrivent dans les autres parties." p. 10.

M. J. L. Petit, (in the chapter "Des Ulceres" contained in the second volume of his *Traité des Maladies Chirurgicales*, &c. Paris. 1790,) relates a case in which a bullet pierced the two condyles of the femur without entering the joint, of which injury the patient died on the 28th or 30th day. On examining the three cavities of the body after death, no marks of disease were found, except three abscesses in the concave part of the liver, each of the size of an egg, and at some distance from one another. He had no doubt that these were the cause of death, until, on dividing the fractured bone, he found the spongy portion, both of the epiphysis and apophysis, filled with a serous, oily, purulent matter.

Mr. Becket, in his *Chirurgical remarks on a Wound of the Head*, (*Collect. of Tracts*, &c. Lond. 1740, vol. i., p. 4,) mentions the case of a man, who had received a violent contusion on the upper part of his left arm, a little below the shoulder. Suppuration went on for several weeks; the patient at last was seized with shiverings, became feverish, and at length died violently convulsed. There were some marks of inflammation in the cavity of the chest. On the division of the integuments of the abdomen, a very large quantity of yellowish, fœtid matter discharged itself, which

was somewhat viscid; the intestines floated in this matter, for the abdomen was full of it. In the lower part of the concave side of the liver there was a very large abscess. In the lower part of the abscess was an orifice capable of admitting the end of one's finger; by which, without doubt, matter discharged itself into the abdomen.

Klein of Stuttgart, in the work to which I have already had occasion to refer, p. 136, states that he has seen induration and suppuration of the liver, jaundice, &c., follow severe injury of the shoulder-joint and wounds of the chest more frequently than wounds of the head.

M. Larrey states, (*Memoires*, iv. 228,) that he has often seen individuals who had suffered wounds of the ginglymoid articulations of the upper or lower extremities, die in consequence of abscess of the liver, which had probably been going on from the time the wounded parts were attacked with inflammation. He relates the case of a Prussian soldier who had a false joint about the middle of the humerus, in order to obtain the reunion of which a seton was introduced between the fragments. The arm speedily became much inflamed and swelled, and the patient experienced very severe pain in the right hypochondrium, difficulty of breathing, and violent traumatic fever. After death, an enormous abscess was found in the centre of the great lobe of the liver, just about to open into the abdomen.

In the first volume of his *Memoires*, p. 306; M. Larrey has related a case of gunshot wound of the left elbow-joint, on account of which he performed (primary?) amputation. Everything went on well till the 13th day after the operation, when the patient was attacked with nervous fever. The patient died on the 19th day. On opening the body, an abscess was found in the liver; another very large abscess in the left lung, and effusion into the thorax.

Dr. Hennen, in his *Principles of Military Surgery*, after describing the local appearances found on dissection in cases of fractures, remarks, (2d edit., p. 124,) "All this organic injury cannot be supposed to exist without great general disease; the fever, the cough, the diarrhœa, are all harassing and alarming to the greatest degree; they sometimes invade separately, and sometimes in combination, and produce not only all the appearances of pulmonary consumption, but too frequently its fatal termination. If tubercles or a tubercular disposition exists in the lungs, no medical aid will relieve the sufferer; and, indeed, while the great source of irritation remains, even the temporary alleviation of his misfortunes is looked for in vain. The first approaches of these insidious bowel and pulmonary affections are much better combated by management and diet than by any medical means."

I might quote from a great variety of authors to show how much surgeons have been alive to the danger of the effusion suddenly ceasing, in cases of suppurating wounds, and the matter

being conveyed to, and deposited in, internal viscera. Thus, in Handley's *Colloquia Chirurgica, or the Art of Surgery epitomized*, (London, 1733,) there is the following portion of a professional dialogue.

Q. What are repellers?

A. Such medicines as drive back the humour from the part.

Q. What mischief comes of their untimely application?

A. They wrinkle the skin, increase the pain, harden the humour in the part, and often return it to some noble and principal part (p. 17).

M. Le Dran, in his *Traité sur les Playes d'Armes à Feu*, (Paris, 1737,) in speaking of the secondary accidents that may occur in consequence of such wounds, says, (2de partie, p. 98,) "We sometimes see a speedy reflux of matter produce abscesses in parts very distant from the wound; and many things may occasion this reflux, as inflammation of the aponeurotic parts, fever, &c., without its being possible to prevent it. If this reflux take place by the lymphatics going to an emunctuary, and all the matter that is reabsorbed stops there, it is there the abscess forms, and the patient may recover. But if the reflux takes place by the lymphatics which open into the blood-vessels, or by the blood-vessels themselves, the purulent matter that is carried into the torrent of the circulation generally stops at the lungs or liver. The occurrence of such a reflux is announced by irregular shiverings, which are followed by violent accessions of fever accompanied with clammy sweats, and these shiverings succeed one another rapidly till the patient dies. If the deposition takes place in the lungs, an abscess is formed there, and the pus is almost always effused on the diaphragm, when the abscess bursts. If in the liver, one or more abscesses form below its external coat, and when these abscesses burst, the pus is effused into the abdomen. Lastly, if these depositions occur in parts of the body beyond the reach of surgical aid, the patient will infallibly die." The same idea is repeated by Le Dran in the *troisième partie*, p. 108, where he treats "de quelques abcès consecutifs."

M. J. L. Petit, in his chapter entitled *Des Plaies en General*, (*Traité des Maladies Chirurgicales*, i. 6, &c.) has enumerated at considerable length the circumstances which he conceives may occasion the reflux of purulent matter, and the symptoms which announce that this reflux is likely to happen, that it is happening, or that it has happened. The abscesses which succeed to such a reflux, he remarks, (p. 11,) may form in the vicinity of the wound, or be more or less remote from it. It is sometimes in the neighbouring conglobate glands that they form, as in those of the neck when the wound is on the head, in those of the axilla when the wound is on the hand or arm; in those of the groin or loins in wounds of the lower extremities. Lastly, the pus which flows back into the blood is deposited more frequently in the lungs and liver than elsewhere, and more frequently in the liver than in the lungs.

M. Mehee, (in his *Traité des Playes d'Armes à Feu*, Paris, an viii.,) after alluding to the large abscesses that are frequently occasioned by severe contusions, mentions that the fluid forming these abscesses is sometimes taken up again by the vessels, and in this way a reflux of purulent matter is produced. This is rendered apparent by the cessation of the suppuration, and by the dryness of the wound, by violent fever, &c., speedily occasioning the patient's death. The purulent matter after entering the circulation sometimes deposits itself elsewhere. If these depots form externally, they may be opened; but if, as too often happens, they form internally, they are difficult to manage, and the patient very frequently die, because the organs in which these kinds of effusion generally occur are the brain, the lungs, and the liver, and it is scarcely possible to detect their situation in any of these viscera.

The following case occurred under my own observation at Lyons. A boy, about sixteen years of age, was brought into the Hotel-Dieu on the 30th August, with a compound fracture of the leg. The laceration of the integuments was over the spine of the bone, and of small extent.—1st October. Reunion seems to be going on. A small abscess had formed, but has been evacuated, and seems to be healing. With regard to the symptoms which supervened in this case, and which ultimately terminated in death, I can only mention that they were such as to lead M. Mortier, under whose care he was, to suspect and detect that he had committed three several excesses in diet, and to predict before the body was opened that we should find marks of the gastro-enterite, which he conceived these excesses to have occasioned.

Dissection.—The external surface of the skin, as well as the subcutaneous cellular membrane, was of a yellow colour, and the same colour was found to prevail over the external surface of the intestines, over the peritoneum lining the parietes of the abdomen, over the surface of the cartilages of the ribs, and of the cartilages covering the extremities of the long bones. It was observed likewise on the external surface of the *dura mater*. The gall-bladder was found distended. On examining the internal surface of the stomach, M. Mortier acknowledged that the inflammation was very slightly marked, though he thought it certain that it had existed. The mucous membrane was pale over nearly its whole extent. The duodenum, M. Mortier said, was not very red; that it was, however, inflamed, being much browner than the healthy surface of the stomach, the pylorus being the boundary between the different colours. A long worm was found in the small intestines, but their mucous membrane, so far as it was examined, was pronounced to be healthy. About the middle of the right lobe of the liver there existed several abscesses, some of which were beginning to point upon the convex surface, while another situated on the concave surface about an inch to the right side of the gall-bladder, and which had caused the absorption of nearly the whole of the sub-

stance of the liver below it, was prevented from discharging its contents into the abdomen by a preternatural adhesion to the external surface of the duodenum on which it rested. The inferior border of the lung on the same side was somewhat inflamed. No appearance of disease could be observed in the brain.

IV.—*Affections of various Organs occurring subsequently to Surgical Operations.*

I have not been able to ascertain at what time surgeons began to be aware that the occurrence of internal inflammations is much to be apprehended after the performance of severe surgical operations.

M. Mehee was the zealous antagonist of the practice of amputation. A large portion of his doctrine upon this subject he has embodied in the consideration of a case in which the operation was performed, contrary to his advice, on account of an ulcerated knee-joint, which had long been the source of a most copious discharge of pus. The cutting off this outlet so suddenly, could not fail, he conceived, to occasion a deposition of pus in some other quarter; and as the individual in question had previously suffered much from pulmonary complaints, it was in the lungs he anticipated that the evil would manifest itself. The patient died, but M. Mehee did not ascertain by dissection whether or no his death was produced in the way he anticipated.

Dr. Thomson, in his *Lectures on Inflammation*, (Edinburgh, 1813,) in speaking of the effusion or extravasation which occurs in chronic cases of pleuritic and peritoneal inflammation, which, he remarks, has a stronger resemblance to milk coagulated by white wine, than to any other substance to which he can compare it, adds, "I have seen this kind of effusion repeatedly in inflammations of the chest succeeding in old people to severe surgical operations, as, for example, after the amputation of a limb; but I am ignorant of the particular constitutions, and of the state of the body in which it occurs." (p. 245.)

Mr. Guthrie, in his work on *Gunshot Wounds of the Extremities*, London, 1815, in arguing for the superiority of primary over secondary amputation, alleges, p. 74, that it is in cases of the latter class particularly that "the febrile irritation returns some time after the operation, instead of gradually abating; and after a continuance of a few days, or in some hours, cuts off the patient by an affection of some particular part. If it be the lungs, and they are most usually affected, the breathing becomes uneasy, there is little pain when the disease is compared with pneumonia or pleuritis; the cough is dry, and not very troublesome; the pulse having previously been frequent, there is but little alteration; the attention of the surgeon is not sufficiently drawn by the symptoms to the state of this organ, and in a very short time all the symptoms are de-

teriorated ; blisters are employed, perhaps blood-letting, but generally in vain ; and the patient dies in a few hours as in the last stage of inflammation of the lungs, in which effusion or suppuration has taken place. The first cases I saw of this kind," continues Mr. Guthrie, "I believed to arise from the action of external causes after the operation ; but I now believe it to depend upon a determination to, or irritation in, a particular part, in consequence of the operation, and I conceive the viscera in each person most pre-disposed to disease will be the most likely to be affected."

Mr. Guthrie refers to Mr. Rose, at that time Surgeon of the Guards, and to Mr. Boutflower, Surgeon to the Forces, as having made observations similar to his own relative to the occurrence of inflammatory affections of the chest, subsequently to amputation.

"When the viscus affected is not so immediately concerned in supporting life as the lungs, I do not believe the termination is so rapid : it runs into suppuration, and abscesses are formed, which are generally supposed to arise from the commotion and shock given to the different organs at the moment of injury."

"I know that inflammation taking place in one part of the body, when the injury has been received in another, has been often noticed ; and that this also happens in gunshot wounds, there can be no doubt, but it is by no means a common occurrence." Besides referring to a case related by Baron Larrey, Mr. Guthrie has related a case of compound fracture of the thigh, in which Dr. Cherm-side of the 10th Hussars, performed amputation five weeks after the injury, when the man was in a very reduced state with profuse discharge, great pain, and severe hectic fever. On the third day after the operation, the stump being easy, he complained of difficulty of swallowing, and a little pain in the situation of the thyroid gland, which, the next morning, was found to be swelled and inflamed. On the third day after the affection of the throat, the difficulty in deglutition increased, accompanied by some obstruction in respiration, and on the morning of the fourth he died, seven days after the operation, and in a state of great emaciation. On dissection, the whole substance of the thyroid gland was found destroyed, and good purulent matter deposited in its place, which descended by the sides of the trachea and œsophagus to the sternum, and had all but found its way into the larynx, between the cricoid and thyroid cartilages on the right side. The surrounding parts were but slightly injured, and could be readily dissected.

Mr. Guthrie has related another case of secondary amputation, in consequence of a gunshot wound penetrating the knee-joint, in which death occurred nearly two months after the operation, and in which he found, on raising the soleus muscles of the opposite limb, which appeared perfectly sound, and of which he had never complained, for considerable attention was paid to him, a membranous bag containing a fluid in the course of the *tibialis posticus* muscle, and close to the interosseous ligament. "I punctured this shining, semitransparent bag, which appeared to be the fascia run-

ning across, and let out between three and four ounces of good, thick, yellow, inoffensive, purulent matter. The blood in the peroneal vein, which was close to the outside of the sac, was coagulated, or, rather, a coagulum had formed in it prior to death. There was no imperceptible cause of injury, and little or no mark of inflammation; it would indeed give the idea of having been deposited without any. The integuments were quite in a natural state."

"I am not aware," concludes Mr. Guthrie, "that this sudden and insidious attack of disease has been noticed hitherto as a disadvantage attending, in particular, secondary operations; and in thus mentioning it, I am desirous of drawing the attention of military surgeons to it, and of gaining further information on the subject; for, as I have already stated, I have reason to believe many cases are lost in this way, without the cause of death being ascertained by dissection."

Mr. Charles Bell, in an essay entitled "*Pulmonary Diseases in connection with Local Irritation, and consequent upon Wounds and Surgical Operations*," which he has published in the first volume of his *Surgical Observations*, London, 1816, p. 241, has expressed his opinion that inflammation of the lungs is by far the most frequent cause of death in severe wounds, and especially in compound fracture. The lungs Mr. Bell considers to be peculiarly liable to become diseased in cases of this nature, merely from their being the viscera, which, in most people, are most liable, from predisposition or from previous derangement, to take on disease, when the general health becomes affected from accidental causes.

"On reviewing this subject," says Mr. Bell, p. 257, "it will be apparent that injuries to the frame, whether the effect of wounds or of surgical operations, by exciting a high state of irritation, tend to disorder the lungs; and that especially, if there be any tendency to disease in this organ, it will be developed; and, increasing the constitutional disturbance, endanger the patient's life. It also appears that as wounds, by their sudden and more violent inflammation, produce a corresponding acute attack on the lungs, so do they often, by more gradual influence, bring on a phthisis."

Dr. Hennen, in treating of amputation, observes, (2d edition, p. 268,) that "Large quantities of purulent matter are sometimes found in fatal cases of amputation, in the thorax, either in the substance of the lungs themselves, or floating loose in the cavity; or serous effusions, and great congestions of blood in the body of the lungs, with conversion of them into a substance resembling liver, designated by the appropriate appellation of hepatization by the French surgeons. In the abdomen abscesses are often discovered, particularly in the liver, and at a very short period from the removal of the limbs. In the adjacent joints, also, matter is frequently found. I have met with it in three cases in the hip-joint, where the operation had been performed in the thigh, and two in the shoulder-joint, where the arm was carried off by cannon-shot; and even in parts

still more distant from the original injury, diseased actions, apparently sympathizing with the state of the stump, have also been discovered. I know of no particular set of symptoms that peculiarly characterize these instances of metastasis. Great irritative fever has been present in some cases; hectic and topical affections of the chest, as dyspnoea, cough, and sense of suffocation, have been found in those where metastasis to the thorax has taken place; and the usual symptom of deranged biliary functions have appeared before death, where the liver has been its seat. Of the cure of cases of this nature I can say nothing satisfactory."

Dr. Hennen has added some cases illustrative of these observations, p. 271, &c.

The following case fell under my own observation.

Lyons, 25th October, 1823. This morning Mr. Janson performed amputation on a woman about 30 years of age, about half way up the left thigh, on account of a scrofulous knee-joint. The thigh and leg were both greatly emaciated; the knee-joint was in a state of demiflexion; the inferior end of the thigh formed a similar projection outwards. In performing this operation, M. Janson carried his knife through the integuments and muscles down to the bone, without drawing, or dissecting, back the skin, or waiting for the retraction of the external muscles. The bone consequently was sawn through very nearly at a level with the external incision. The integuments were then pulled down over the bone as far as could be done, and a roller applied from above downwards, to keep them in this situation. The cavity formed by the two lips of the wound was stuffed with charpie and compresses; and over the whole more charpie and another roller were applied.

Febrile symptoms manifested themselves on the second or third day after the operation, and became gradually more severe. The bone was seen to project beyond the level of the flesh at the first dressing, and this projection continued to increase. The secretion of purulent matter was small in quantity, and there was no appearance of the formation of granulations. The surface of the wound was pale and flabby-looking.

8th November. M. Mortier remarked to-day, that, though there is very little appearance of inflammation on the surface of the stump, as manifested by the trifling suppuration, &c., the patient is labouring under a high degree of inflammatory fever; that this must arise from the existence of inflammation in some of the internal organs; and that in cases of external injury inflammation often goes on to a very great extent in internal viscera, without occasioning any symptom that leads to a suspicion of its existence. With regard to the present case, M. Mortier remarked, that there is no reason to suppose the inflammation to be situated in the head or in the abdomen. The patient has slight cough, and complains of some degree of pain in the chest, and we may therefore suspect the existence of pleurisy. She is evidently sinking fast; has the *facies hippo-*

cratica, and complains much of pain, during the dressing of the stump.

On proceeding to examine the body after death, the *pia mater* was found slightly infiltrated with serum; a small quantity of purulent matter was found on the surface of the right hemisphere of the brain, and on cutting into its substance, three abscesses, each of about the size of a shilling, were found in the superior and posterior portion of the same hemisphere, from three-fourths to one inch and a half below the surface. The two ventricles contained a little water.

On opening the thorax, there was found a quantity of sero-purulent fluid, mixed with flakes of lymph, effused in the left cavity of the pleura. A considerable quantity of lymph, of a very yellow colour, adhered to the *pleura pulmonalis* of the inferior lobe of the left lung. The substance of the inferior lobe of each lung was in a state of inflammation, and contained a number of small points of suppuration. The mucous membrane of the trachea and its ramifications was somewhat inflamed.

The surface of the stump was covered by a layer of lymph-looking matter, and seemed in some parts to be beginning to purse a little round the bone, which protruded at least an inch beyond the level of the soft parts.

In another case which fell under my observation at Lyons, that of a man in whom erysipelas of the arm, succeeding to a bruise in the little-finger, terminated fatally, the brain was found covered by a layer of purulent matter, and an abscess had formed in the cerebellum.

In the third volume of the *Foreign Quarterly Journal*, p. 294-5, a case of lithotomy performed by M. Dupuytren is related, in which the patient died in a few days, and inflammation of the chest, with effusion of lymph into that cavity, was found on dissection.

Conclusions.—1. That individuals labouring under a chronic affection of any internal viscus are liable to have an acute inflammatory attack induced in that viscus, by local injuries of remote parts of the body.

2. That inflammatory affections of different organs and textures are liable to occur in individuals who have suffered local injuries, but in whom there is no reason to suppose any disease of these viscera to have existed previously.

3. That different viscera are liable to be affected in different cases of injury of the same part of the body; and that, on the other hand, the same viscera may become affected in cases of local injury, of different parts of the body.

4. That in many instances of local injury, pus is effused into remote organs, though suppuration has not occurred in the seat of the primary injury.

5. That the occurrence of affections of remote organs in cases of this nature is generally accompanied by some change in the ap-

pearance of the primary injury—as the cessation of the effusion of pus in cases in which suppuration had commenced.

6. That these secondary affections of remote organs occur at very different intervals of time after the reception of the primary injury.

7. That symptoms occasionally occur in cases of this nature, that enable the practitioner to determine which organ is affected,—as cough, when the lungs, and jaundice when the liver, become inflamed.

8. That in most instances, however, the progress of the disease in the remote viscera is very insidious, and affords few or no indications of its existence.

9. That the most probable mode of preventing the occurrence of inflammation in remote organs, subsequently to injury or amputation, is to moderate the constitutional inflammatory tendency, which local injuries produce to a greater or less degree, and particularly to direct these precautions to the organs that may be known to be predisposed to disease, or that show any tendency to become affected.

THE END.

ON DENGUE

HISTORY, PATHOLOGY

TREATMENT

BY HENRY D. ENCK, M.D.

LECTURER ON THE DISEASES OF THE TROPICS IN THE
UNIVERSITY OF PENNSYLVANIA

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